UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/982,784	10/22/2001	Toshiaki Hongo	08372.0004	8405

7590 07/01/2003

Finnegan, Henderson, Farabow,
Garrett & Dunner, L.L.P.
1300 I Street, N.W.
Washington, DC 20005-3315

EXAMINER	
HASSANZADEH, PARVIZ	
ART UNIT	**PAPER NUMBER**
1763	

DATE MAILED: 07/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/982,784	Applicant(s) HONGO, TOSHIAKI	
	Examiner Parviz Hassanzadeh	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sh et with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 October 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 October 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "30" on page 6, line 22. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "96" has been used to designate both "supporting step" in Fig. 2 and "planar antenna member" in Fig. 3. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance. It is suggested to change 96 to 76 in Fig. 3 in accord with the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 6-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art (Fig. 9, pages 1-2) in view of Mabuchi et al (US Patent No. 5,645,644).

Admitted prior (Fig. 1) art teaches a plasma processing apparatus comprising:

a process chamber 4 including an opened ceiling and an internal space S which can be evacuated;

an insulating plate 8 air-tightly attached to the ceiling of the process chamber;

a mount base 6 placed in the process chamber for mounting thereon a workpiece W to be processed;

a planar antenna member 10 placed above the insulating plate 8 and including a microwave radiation hole 18 for transmitting therethrough microwave used for generating plasma, the microwave transmitted through the insulating plate 8 into the process chamber 4; and

gas inlet (*gas supply means*) (coupled to the sidewall as shown in the drawing on the right side) for supplying a predetermined gas into the process chamber.

The admitted prior art fail to teach the insulating plate divided into a plurality of regions; and a heat medium path for flowing a heat medium along a line by which the insulating plate is divided into a plurality of regions.

Mabuchi et al teach a microwave plasma processing apparatus (Fig. 7A, 7B, 8A, 8B) including a window support member 5 for supporting a plurality of microwave transmitting windows 4 (*insulating plates*) (column 6, lines 1-15) an crossing beams 5b (*heat medium path or flowing a heat medium along a line by which the insulating plate is divided into a plurality of regions*) provided in the beams 5b for flowing gas through the beams into the chamber which increases the gas supply density around the beams 5b, thereby improving the uniformity of plasma (column 7, line 40-64). The plurality of windows 4 allows the apparatus to be capable of processing large size substrate (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the microwave transmitting window frame incorporated a plurality of windows and the gas distributing beams as taught by Mabuchi et al in the apparatus of the admitted prior art in order to render the apparatus capable of processing large size substrates.

Further regarding claim 1: the gas flowing through the beams 5b of Mabuchi et al would affect the temperature of the beams because the flowing gas is normally at room temperature while the beams being exposed to the plasma are at higher temperature.

Further regarding claim 2: the arrangement of the gas flowing beams along the peripheral part is considered to have been an obvious modification for further distribution of gas along the perimeter of the substrate.

Further regarding claim 6: the admitted prior art further teaches that the insulating plate is made of aluminum nitride (page 2, lines 20-22).

Further regarding claim 7: as shown in Fig. 8A of Mabuchi et al , the plurality of windows are arranged around a central part of the window support member 5.

Further regarding claims 8, 9, 12, 15: the arrangement of the microwave radiation holes of the planar antenna member of the admitted prior art with respect to the window support member of Mabuchi et al such that holes are displaced from the support and thus from the beams 5b is considered to have been obvious to one of ordinary skill in the art.

Further regarding claims 10, 11, 14: as discussed above, Mabuchi et al teach a window support member 5 (*support frame member*) for supporting a plurality of microwave transmitting windows 4 (*insulating plates*) (column 6, lines 1-15) an crossing beams 5b (*heat medium path or flowing a heat medium along a line by which the insulating plate is divided into a plurality of*

regions) provided in the beams 5b for flowing gas through the beams into the chamber (column 7, line 40-64).

Further regarding claim 13: Mabuchi et al further teach O-rings 7 and 11 (*sealing means*) interposed between window and frame and between frame and chamber, respectively (column 5, lines 37-46).

Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (Fig. 9, pages 1-2) in view of Mabuchi et al (US Patent No. 5,645,644) as applied to claims 1, 2, 6-15 above, and further in view of Kanai et al (US Patent No. 5,914,051).

The admitted prior art in view of Mabuchi et al teach all limitations of the claims as discussed above except for temperature control device (means) for controlling the temperature of the heat medium, the insulating plate to a predetermined temperature.

Kanai et al teach microwave plasma processing apparatus (Figs. 23 and 25) including a block 30e (a microwave window support) supporting a microwave transmitting window 40s, wherein the support having formed therein a heat medium chamber 170 (heat medium path) for flowing a heat medium therethrough (column 15, line 66 through column 16, line 5). Ss shown in Fig. 25, the apparatus further include a heat medium feeder 173 for varying the temperature of the heat medium, and a heat medium controller 175 which is coupled to the heat medium feeder 173 and a terminal 174 detecting the temperature of the block 30e. The controller sets the temperature of the block to a predetermine value (column 17, lines 18-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the temperature control mechanism as taught by Kanai et al in the

apparatus of admitted prior art in view of Mabuchi et al in order to keep the temperature of the window supporting member as a preset constant value.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Yamazaki et al (US Patent No. 6,059,922) teach a microwave plasma processing apparatus (Fig. 18) including a mechanism for cooling microwave transmitting window;

Katayama et al (US Patent No. 5,545,258) teach a microwave plasma processing apparatus (Fig. 4B) including a support member for supporting a plurality of microwave transmitting windows as well as for distributing gas into a process chamber; and

Ishii (JP 11-339997-A) teaches a microwave plasma processing apparatus (Fig. 4) including a mechanism for cooling microwave transmitting window.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parviz Hassanzadeh whose telephone number is (703)308-2050. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703)308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9310 for regular communications and (703)872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

P. Hassanzadeh

Parviz Hassanzadeh
Primary Examiner
Art Unit 1763

June 27, 2003